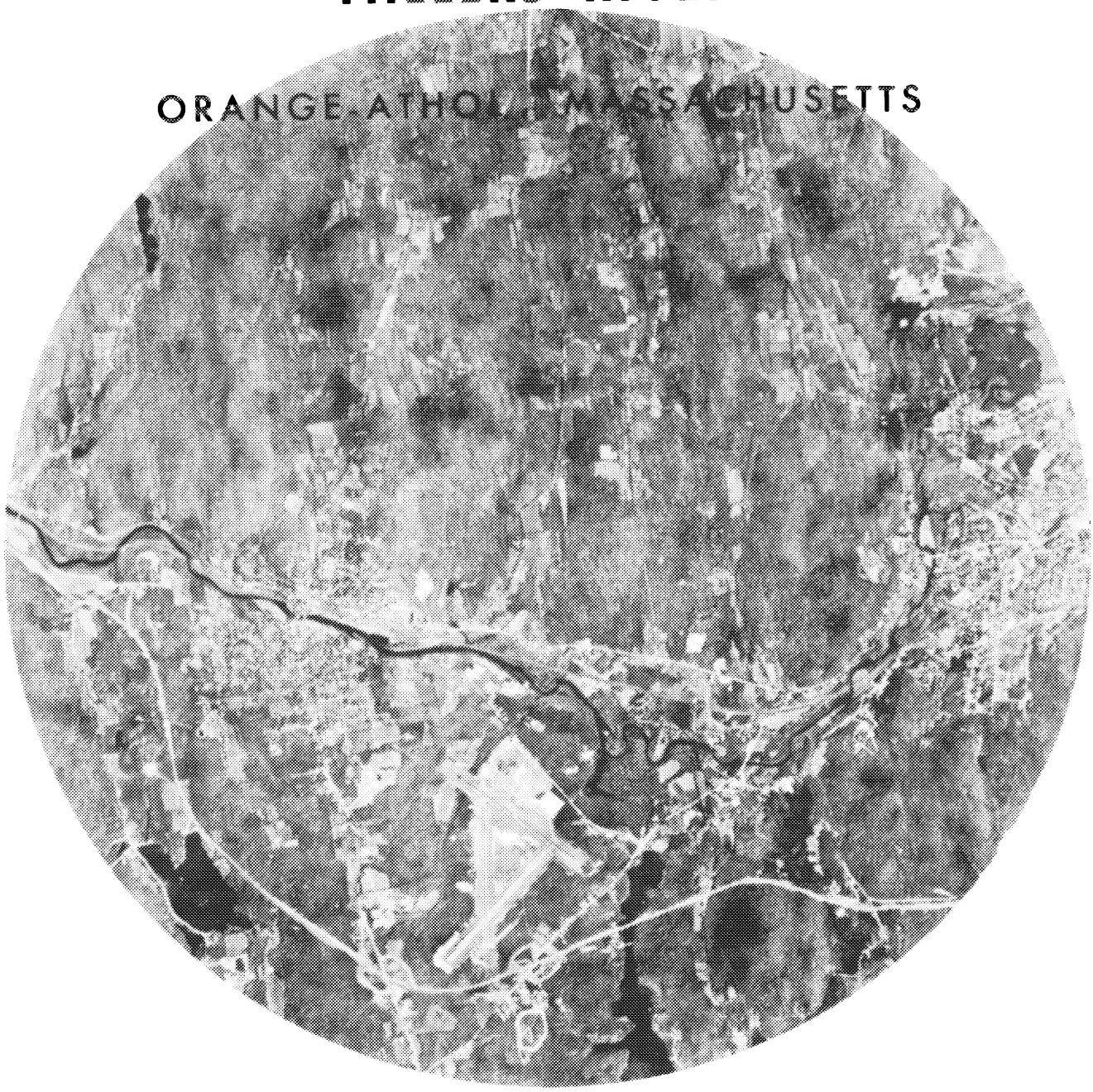
FILE COPY

FLOOD PLAIN INFORMATION

MILLERS RIVER

ORANGE-ATHOL, MASSACHUSETTS



U.S. ARMY ENGINEER DIVISION, NEW ENGLAND

AUGUST 1965

FLOOD PLAIN INFORMATION

MILLERS RIVER

ORANGE-ATHOL

MASSACHUSETTS

SUMMARY REPORT

This study, authorized under Section 206, Public Law 86-645, was requested by the Commonwealth of Massachusetts.

U. S. Army Engineer Division, New England
Corps of Engineers
Waltham, Mass.

July 1965

INTRODUCTION

Since time began, heavy rains and melting snows have periodically changed small brooks and peaceful rivers into raging torrents which overflow their banks and endanger whatever lies on the nearby lowland. Before man found reason to build and live on these plains, floods were of little consequence; but with the coming of civilization and the occupation of these lands, floods frequently result in disaster to individuals, their families and their communities.

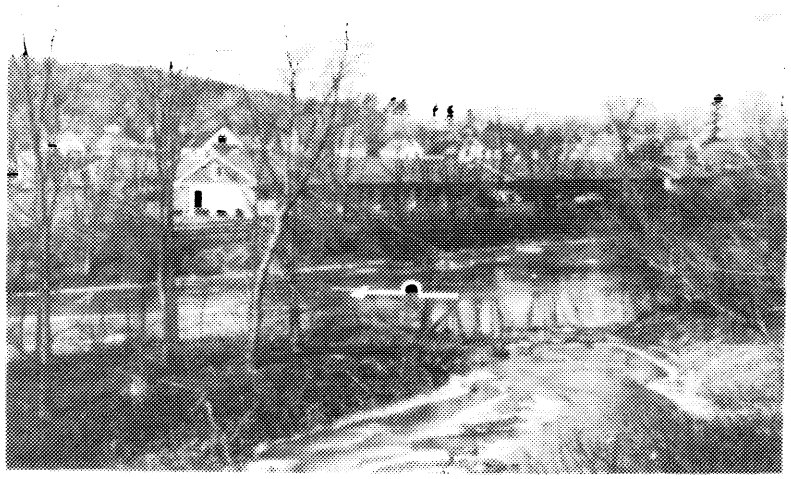
In terms of geological time, severe floods are a frequent occurrence. In terms of a man's life, they are rare - rare enough to dull the memories of destruction and to allow him to build on land which he is vaguely aware may possibly be subject to some sort of flood hazard.

During the last 25 years, the Federal Government has spent huge sums of money to reduce the human suffering and property damages that are caused by floods. The dikes, floodwalls and flood control reservoirs that have resulted have more than paid for themselves. Nonetheless, flood losses today are as great, if not greater, than ever before because of man's continuing encroachment on the flood plain. People, often without realizing the risk, are constructing new developments in flood-prone areas (see Photo 1) and are reducing channel capacities by filling in flood channel areas. (See Photo 2).

Examples can be found in most every riverside community. Flood hazards are thereby increased and the effectiveness of existing flood control works is correspondingly diminished.

To assist communities in preventing future flood damages, Congress has authorized the Corps of Engineers to publish information on flood hazards and make criteria available for planning the use of areas subject to flooding. In addition, the Commonwealth of Massachusetts has enacted a Zoning Enabling Act giving the towns the authority to establish zoning laws controlling the use of the flood plains.

At the request of the Water Resources Commission of the Commonwealth of Massachusetts, a flood plain information report has been prepared by the Corps of Engineers for the Millers River within the Athol and Orange town limits. That report is intended to help the towns in establishing flood plain regulations and to aid property owners in weighing the advisability of further development in the flood plain. Copies of that report are available for inspection at the office of the Town Clerk in each town and also the Water Resources Commission, 15 School Street, Boston, Massachusetts. This pamphlet has been prepared for a wider distribution to make the public aware of the continuing flood problem along the Millers River and to help insure that future development will be made with the knowledge of the potential flood risks and hazards.



1. Morton Meadows Housing for the Elderly - Athol (1964) (lower elevations will experience problems in a recurrence of 1936 Flood).

2. South Street Well Pump House constructed on fill in flood plain - Athol (1964)

FLOOD PROBLEM

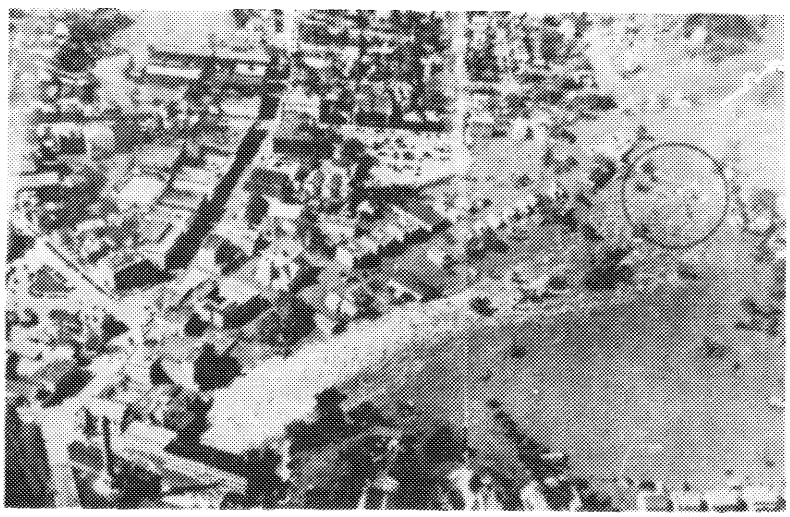
In the long history of flooding along the Millers River, the floods that stand out in everyone's memory are the spring of March 1936 and the hurricane of September 1938.

In March of 1936, the Athol-Orange area experienced two damaging floods approximately one week apart. The first was caused by a combination of 2.5 inches of warm rain falling on snow covered hills. Vast stretches of floating ice, more than 3 feet thick, contributed to the problem. Four days later, an additional 3 to 4 inches of rain fell and the already swollen river rose again to the highest elevation recorded at that time. The damages resulting from the two storms amounted to over $2 million at 1936 prices.

Two and one-half years later, in September 1938, the area was hit by the greatest flood recorded in the basin (see Photos 3 and 4). The estimate of the damages was over $2\frac{1}{2}$ million at 1938 prices. The flooding was caused by over 12 inches of rainfall associated with a tropical hurricane.

Since the time of these floods, the Corps of Engineers has constructed the Birch Hill and Tully flood control dams and the Commonwealth of Massachusetts has improved the river channel at several locations in the towns of Athol and Orange. These projects provide a

3 1938 Flooding of Orange Business Center (courtesy of Robert W. Hames, Athol)



4. 1938 Flooding of Athol Business Center, Exchange Street Bridge - circled (courtesty of Robert W. Hames, Athol)

high degree of protection in the watershed but cannot completely eliminate the hazard of flooding in all downstream communities. Plates 2 to 4 show the elevations and the extent of flooding that will be experienced in a recurrence of the 1936 and 1938 storm conditions with the Birch Hill and Tully dams in operation.

Since 1938, the inhabitants of the Millers River valley have been fortunate in being spared from the disasters that were experienced in adjacent river basins such as in December 1948, August and again in October 1955. Therefore, any planning for future development should recognize the possibility of floods greater than have been experienced. For this reason, a Standard Project Flood as reduced by the reservoirs has been included in the exhibits. This flood, which is considered to be a measure of the flood potential of the Millers River is normally used by the Corps of Engineers in the design of dikes, floodwalls and channel improvements in highly developed areas.

The extent of flooding shown by the plans on Plates 2 to 4 is approximate. To determine the depth of flooding for a specific piece of property, the elevations from the profile should be related to actual ground elevations determined by standard survey methods. An inspection of the exhibits show that the 1936 and 1938 floods reduced by reservoirs will cover approximately the same area although the 1936 flood will be about 1 foot higher in elevation.

All the floods shown are intended to serve only as guides. The estimates of future flooding by their nature cannot be exact but do give reasonable probabilities of flooding based on past records. There can, of course, be no assurance that a flood comparable to the standard project flood will not occur in the near future nor can it be guaranteed that floods comparable to those experienced will not occur in two consecutive years.

There is sufficient flood-free land in the two communities to accommodate the residential growth without using the flood plain of the Millers River. However, commercial or industrial expansion may prefer land adjacent to existing development or major highways bordering or in the flood plain. Too often, developers seem to overlook the detrimental factors when estimating the value of a flood plain site. It therefore appears that some local guidance or control is desirable to achieve orderly growth of the communities and preclude the suffering from floods and the need for costly flood control improvement.

WHAT CAN BE DONE

The ultimate goal of flood plain regulations is to provide for optimum land use consistent with flood hazards and industrial growth. This requires the evaluation of certain costs not associated with upland development, such as cost of protection, floodproofing, higher insurance rates and possible flood losses. In addition to costs, the effect of obstructions such as land fill must be analyzed to determine that it will not create new flood problems for others upstream and downstream.

The problems of filling are twofold. First, the filling of a flood plain can reduce the cross section of the valley and become a restriction, thereby raising the river elevation upstream for any given discharge. Second, filling can aggravate conditions downstream. In this case, the valley is very broad so it is possible to fill and still leave a waterway area large enough for the passage of a flood. However, the act of filling has eliminated a natural flood control reservoir which benefited downstream communities. Therefore, any potential filling should be coordinated between the towns to determine its overall effect.

Once the degree of risk has been recognized, consideration may be given to retaining the lower levels of the flood plain for "open use" such as parking areas, parks and recreation areas. Any structure

permitted would be the type that could be flooded without serious consequence. In the higher elevations, structures for commercial or industrial use might be permitted, provided they are structurally sound, waterproof and cause no serious restriction to the movement of floodwaters.

The objectives of such a program can be achieved in many ways. The more common are:

Encroachment Lines. The Commonwealth of Massachusetts and the towns have the authority to establish lines along the river beyond which no obstruction or encroachment may be made without a permit.

Zoning. The towns have the authority to establish zoning similar to other types of zoning authorized for the health, safety and general welfare of the community.

Subdivision Regulation. With zoning in effect, subdivision regulations can be amended to control uses in the flood plain.

Building Codes. These ordinances can establish requirements that will insure that buildings are waterproof and will not float off their foundations.

Others. The towns could purchase some of the lands and combined with an open space conservation program form an effective means of controlling the flood plain. In addition, financial institutions may assist by denying funds for projects in which they estimate the flood risk to be too great.

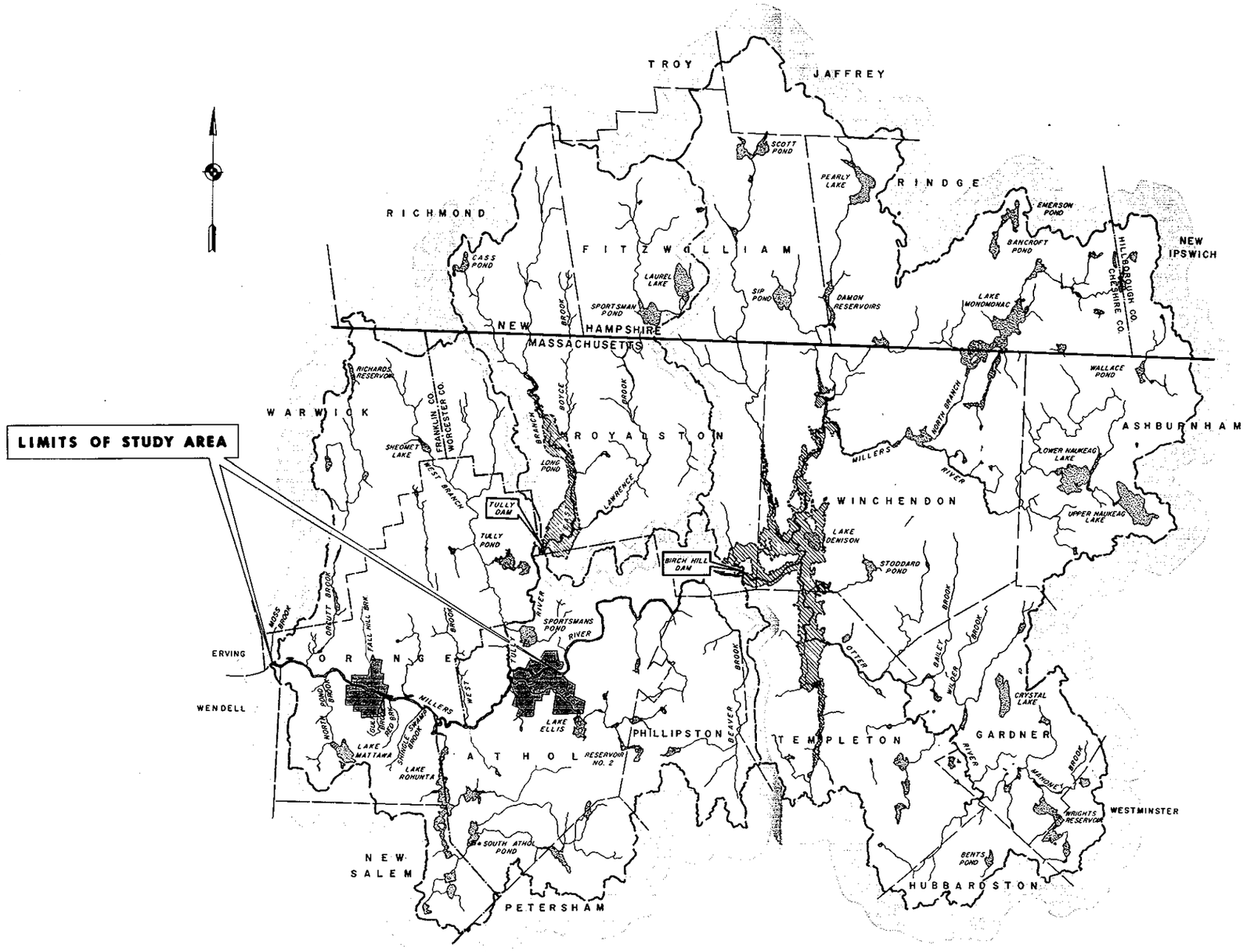
Other means of reducing flood damages for existing conditions would be to modify structures to make them flood proof, keep channels clear of debris or fallen trees which may pile up against bridges and thereby create temporary dams and also maintain an efficient warning and evacuation system incorporated with Civil Defense measures. The flood warning system should be coordinated with the U. S. Weather Bureau office at Bradley Field, Windsor Locks, Connecticut since they are responsible for forecasting floods in the Millers River.

Long-range planning to reduce future flood damages and still allow for orderly growth of the communities will require cooperation and coordination among the towns and the Commonwealth of Massachusetts. It has been shown time and time again that preventive measures must be taken in advance of an emergency, for once a flood has started counter measures are usually too late to be effective. It is therefore urged that past lessons be remembered. Rivers when on a rampage have a habit of asserting their own real estate rights in flood plain areas.

"IT WASN'T RAINING WHEN NOAH BUILT THE ARK"

CORPS OF ENGINEERS

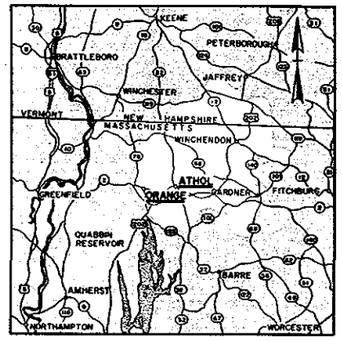
U.S. ARMY



PLAN

SCALE IN MILES

1 0 1 2 3



LOCATION MAP

SCALE IN MILES

0 5 10 15

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BOSTON, MASSACHUSETTS

FLOOD PLAIN INFORMATION

MILLERS RIVER

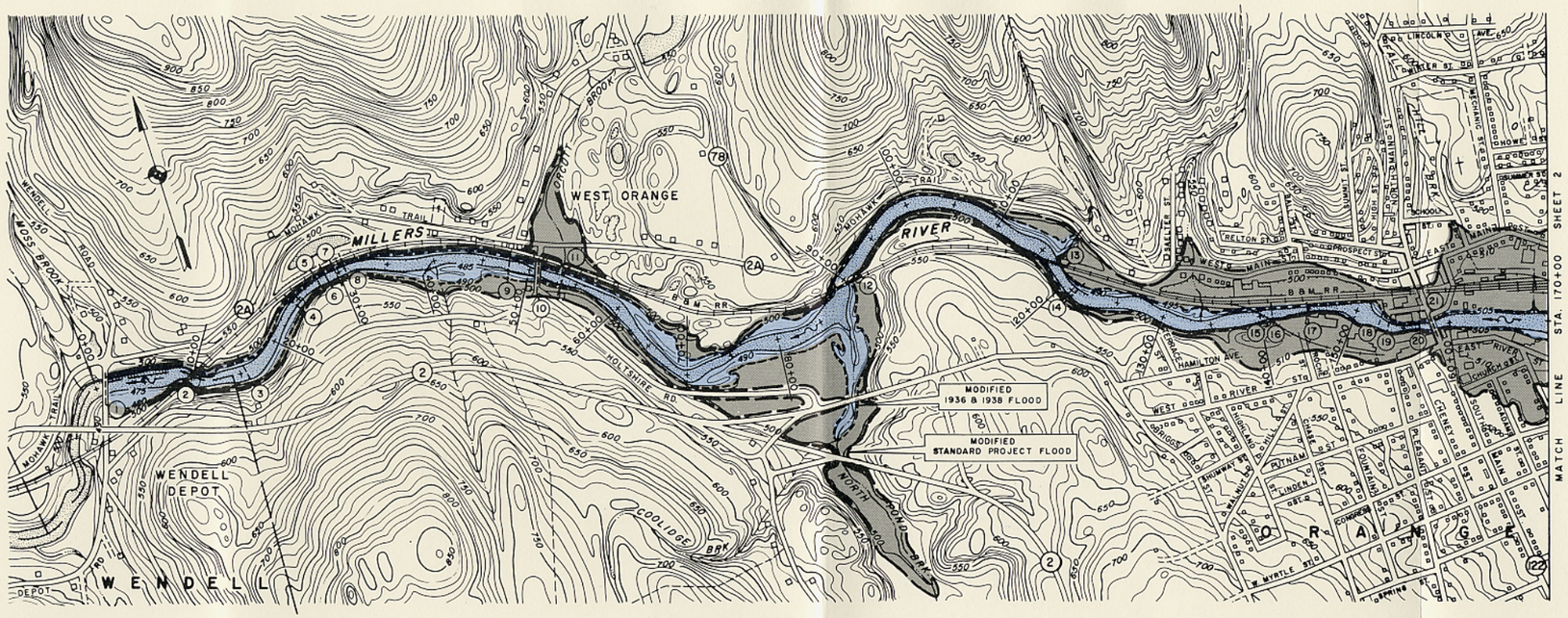
ATHOL - ORANGE, MASSACHUSETTS

WATERSHED MAP

JUNE 1965

U.S. ARMY ENGINEER DIVISION NEW ENGLAND
CORPS OF ENGINEERS WALTHAM, MASS.

PLATE NO. 1



PLAN

SCALE IN FEET
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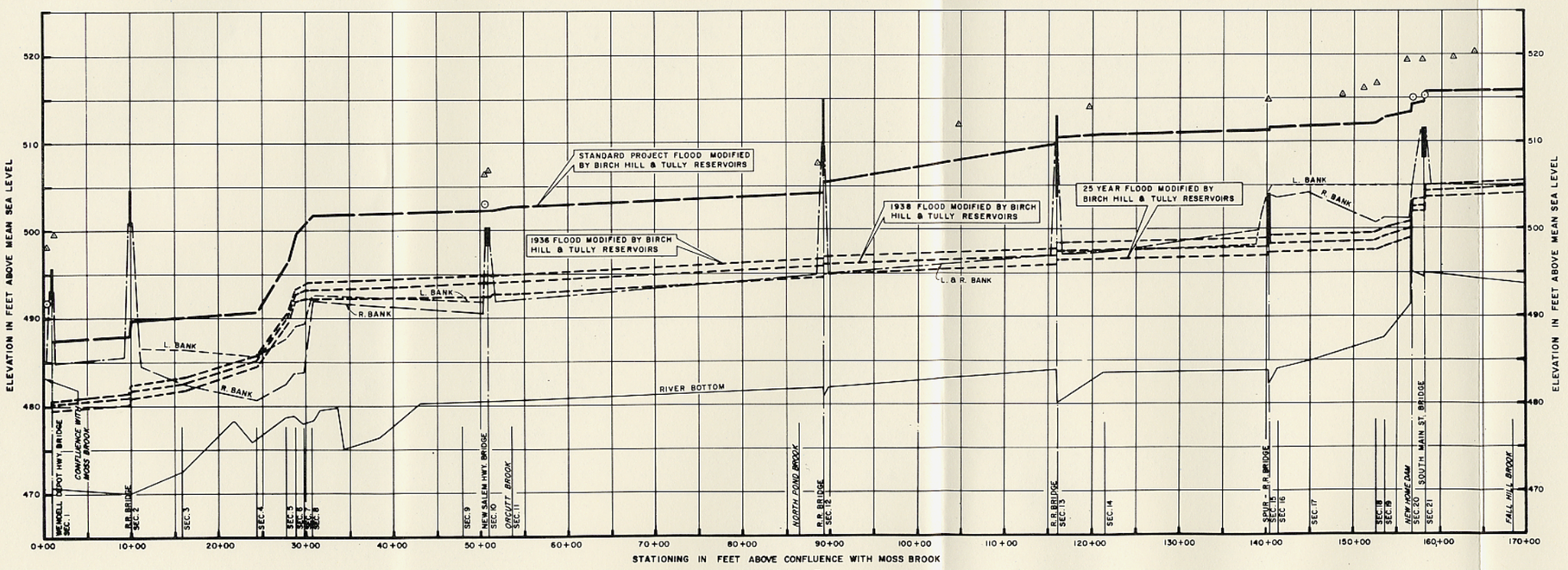

PROFILE

NORMAL RIVER AREA | MODIFIED 1936 & 1938 FLOODS | MODIFIED STANDARD PROJECT FLOOD

(3) RIVER CROSS-SECTION

△ EXPERIENCED 1938 FLOOD HIGHWATER MARK

○ EXPERIENCED 1936 FLOOD HIGHWATER MARK

NOTES:

ELEVATIONS REFER TO MEAN SEA LEVEL DATUM, CONTOUR INTERVAL EQUALS TEN FEET WITH SUPPLEMENTAL FIVE FOOT CONTOURS ADDED ALONG THE RIVER.

TOPOGRAPHY BASED ON U.S.G.S. MAPS.

BANKS DEFINED AS LEFT AND RIGHT WHEN LOOKING IN A DOWNSTREAM DIRECTION.

ANDERSON-NICHOLS
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BOSTON, MASSACHUSETTS

FLOOD PLAIN INFORMATION

MILLERS RIVER

ATHOL - ORANGE, MASSACHUSETTS

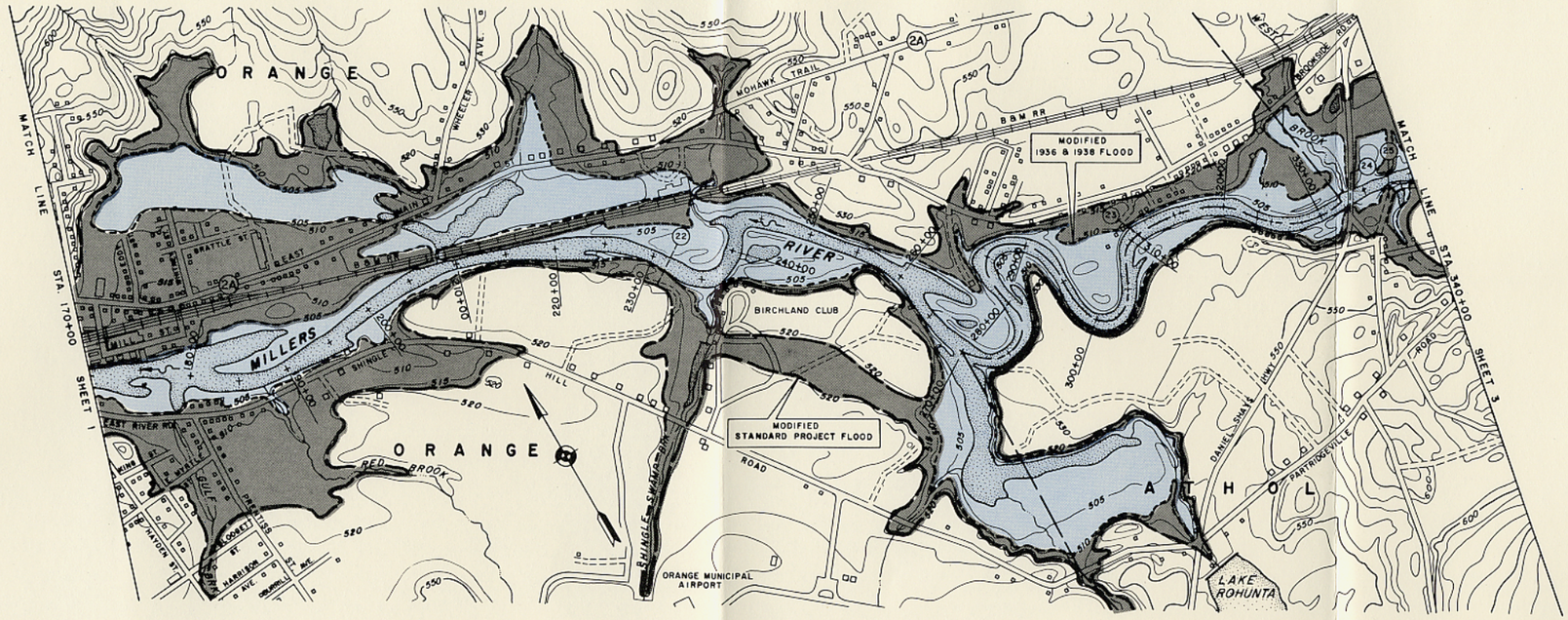
PLAN AND PROFILE

SHEET 1 OF 3 STA. 0+00 TO STA. 170+00

JUNE 1965

U.S. ARMY ENGINEER DIVISION NEW ENGLAND
CORPS OF ENGINEERS WALTHAM, MASS.

PLATE NO. 2



PLAN

SCALE IN FEET
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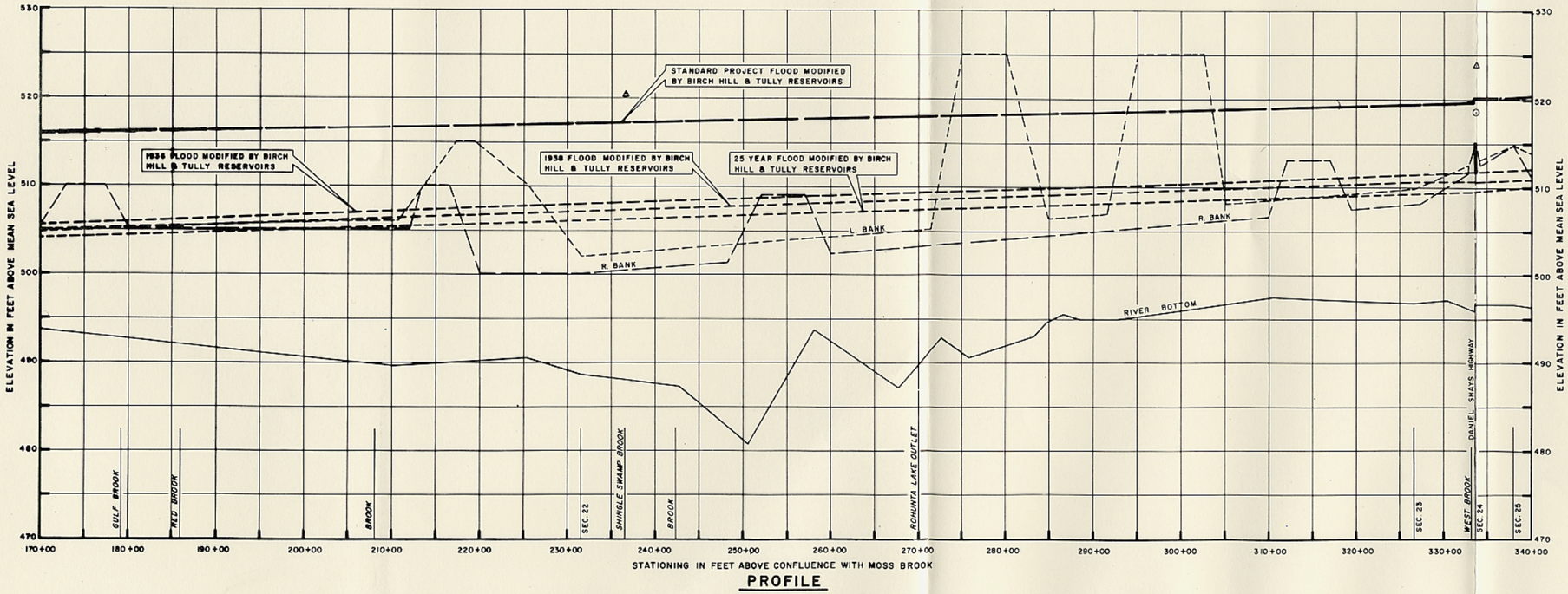

PROFILE

NORMAL RIVER AREA | MODIFIED 1936 & 1938 FLOODS | MODIFIED STANDARD PROJECT FLOOD

(3) RIVER CROSS-SECTION

△ EXPERIENCED 1938 FLOOD HIGHWATER MARK

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FLOOD PLAIN INFORMATION

MILLERS RIVER
ATHOL-ORANGE, MASSACHUSETTS

PLAN AND PROFILE

SHEET 2 OF 3 STA. 170+00 TO STA. 340+00

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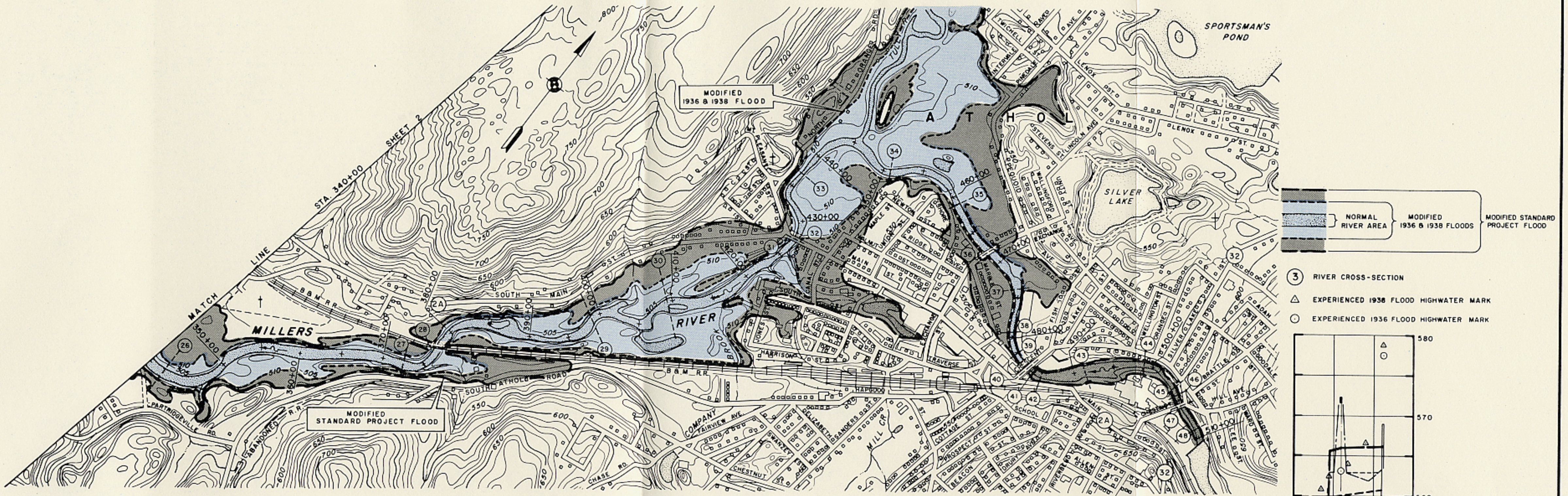
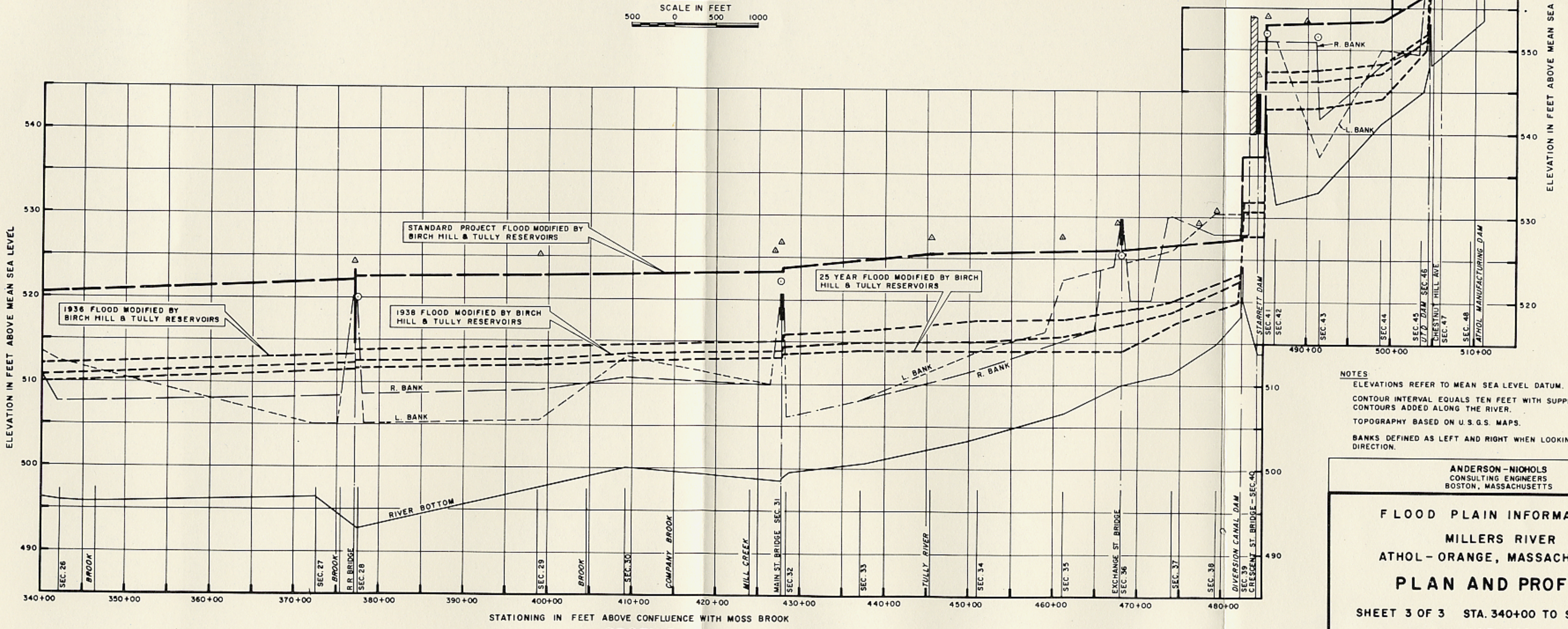
U.S. ARMY ENGINEER DIVISION NEW ENGLAND
CORPS OF ENGINEERS WALTHAM, MASS.

PLATE NO. 3



PLAN

SCALE IN FEET
500 0 500 1000



PROFILE

NOTES

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FLOOD PLAIN INFORMATION

MILLERS RIVER

ATHOL-ORANGE, MASSACHUSETTS

PLAN AND PROFILE

SHEET 3 OF 3 STA. 340+00 TO STA. 511+00

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